

Appl. No. 10/710,437
Amdt. dated June 19, 2006
Reply to Office action of April 3, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

5 **Listing of Claims:**

1. (Currently Amended) A lumped-element diplexer implemented in a multi-layered substrate comprising:

10 a low-pass filter circuit ~~comprising: wherein circuit elements are disposed on a first series of layers of the multi-layered substrate and wherein a first end of the low-pass filter circuit is connected to a first port and a second end of the low-pass filter circuit is connected to a second port~~
a first capacitor plate disposed on a first layer of the multi-layered substrate;
a second capacitor plate disposed on a second layer of the multi-layered
15 substrate; and
a first inductor plate directly disposed on a third layer of the multi-layered
substrate;
a high-pass filter circuit, ~~the high-pass filter circuit comprising: wherein circuit elements are disposed on a second series of layers of the multi-layered substrate and wherein a first end of the high-pass filter circuit is connected to~~
20 ~~[[a]] the first port and a second end of the high-pass filter circuit is connected to a third port~~
a third capacitor plate disposed on a fourth layer of the multi-layered substrate;
a fourth capacitor plate disposed on a fifth layer of the multi-layered substrate;
a fifth capacitor plate disposed on a sixth layer of the multi-layered substrate;
25 and
a second inductor plate directly disposed on a seventh layer of the
multi-layered substrate; and

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5 a ground plane forming a base of the multi-layered substrate, ~~wherein elements of the filter circuits are orientated horizontally with respect to the ground plane and are arranged in layers aligned substantially vertically, these layers being separated by a dielectric material and inter-layer connections being implemented by at least a via;~~

10 wherein circuit elements of the low-pass filter circuit are disposed on a first series of layers of the multi-layered substrate, a first end of the low-pass filter circuit is connected to a first port and a second end of the low-pass filter circuit is connected to a second port, circuit elements of the high-pass filter circuit are disposed on a second series of layers of the multi-layered substrate, a first end of the high-pass filter circuit is connected to the first port and a second end of the high-pass filter circuit is connected to a third port, elements of the filter circuits are orientated horizontally with respect to the ground plane and are arranged in layers aligned substantially vertically, these layers being separated by a dielectric material and inter-layer connections being implemented by at least a via, and wherein no
15 layer is between an uppermost layer of the first series of layers of the multi-layered substrate and a lowermost layer of the second series of layers of the multi-layered substrate.

20 2. (Cancelled)

3. (Cancelled)

25 4. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 1, wherein the circuit elements of the filter circuits comprise inductive elements that comprise plates formed as spirals.

5. (Previously Presented) The lumped-element diplexer implemented in a

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multi-layered substrate of claim 1, wherein the circuit elements of the filter circuits comprise at least one inductive element formed on a plurality of layers of the multi-layered substrate.

- 5 6. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 1, wherein the circuit elements of the filter circuits comprise at least one capacitive element comprising a plurality of plates formed on a plurality of layers of the multi-layered substrate.
- 10 7. (Original) The lumped-element diplexer implemented in a multi-layered substrate of claim 1, wherein the high-pass filter circuit further comprises a low frequency notch filter circuit.
- 15 8. (Currently Amended) The lumped-element diplexer implemented in a multi-layered substrate of claim [[3]] 1, wherein at least the third and fifth capacitor plates are dimensioned to have additional overlapping area in order to realize an additional capacitor equivalence.
- 20 9. (Currently Amended) The lumped-element diplexer implemented in a multi-layered substrate of claim 1, wherein the ground plane forms a zeroth layer of the lumped-element diplexer.
- 25 10. (Original) The lumped-element diplexer implemented in a multi-layered substrate of claim 1, wherein the device is realized in a multi-layered, low temperature co-fired ceramic substrate.
11. (Currently Amended) A lumped-element diplexer implemented in a multi-layered substrate comprising:

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a low-pass filter circuit comprising:

a first capacitor plate disposed on a first layer of a first series of layers of the multi-layered substrate;

a second capacitor plate disposed on a second layer of the first series of layers of the multi-layered substrate; and

a first inductor plate directly disposed on a third layer of the first series of layers of the multi-layered substrate;

wherein the first capacitor plate is connected to a first port, the second capacitor plate is connected to a first end of the first inductor plate and to a second port via a third capacitor plate of a high-pass filter circuit of the lumped-element diplexer, and a second end of the first inductor plate is connected to the first port; and

a high-pass filter circuit comprising:

a third capacitor plate disposed on a first layer of a second series of layers of the multi-layered substrate;

a fourth capacitor plate disposed on a second layer of the second series of layers of the multi-layered substrate;

a fifth capacitor plate disposed on a third layer of the second series of layers of the multi-layered substrate; and

a second inductor plate directly disposed on a fourth layer of the second series of layers of the multi-layered substrate;

wherein the third capacitor plate is connected to the second port, the fourth capacitor plate is connected to a first end of the second inductor plate, the fifth capacitor plate is connected to a third port and a second end of the second inductor plate is connected to a ground plane of the lumped-element diplexer, and wherein the high-pass filter circuit further comprises a low frequency notch filter circuit realized by additional overlapping area of the third and fifth capacitor plates[[]] ; and

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a ground plane forming a base of the multi-layered substrate, wherein elements of the filter circuits are orientated horizontally with respect to the ground plane and are arranged in layers aligned substantially vertically, these layers being separated by a dielectric material and inter-layer connections being
5 implemented by at least a via;
wherein no layer is between an uppermost layer of the first series of layers of the multi-layered substrate and a lowermost layer of the second series of layers of the multi-layered substrate.

10 12. (Cancelled)

13. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 11, wherein an inductor plate comprises a spiral-shaped metal strip.

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14. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 11, further comprising at least one inductive element formed on a plurality of layers of the multi-layered substrate.

20 15. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 11, further comprising at least one capacitive element formed on a plurality of layers of the multi-layered substrate.

25 16. (Previously Presented) The lumped-element diplexer implemented in a multi-layered substrate of claim 11, wherein the ground plane forms a zeroth layer of the lumped-element diplexer.